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EARLY NESTING BY GREAT HORNED OWLS IN MONTANA

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Great Horned Owls (*Bubo virginianus*) begin nesting earlier than any other owl species across its range in the United States and Canada (Austing and Holt 1966, Houston et al. 1998). A correlation is evident between egg laying and latitude, with northern populations laying eggs later than southern ones (Houston et al. 1998). For example, in southern Florida, eggs are often laid in December and rarely in November (Bailey 1925). In North and South Carolina, Great Horned Owls lay eggs in late December (Houston et al. 1998). In Ohio, a total of 903 breeding owls began nesting in January and February (Holt 1996). Craighead and Craighead (1956) found that the earliest egg laying occurred in Michigan was 12 February. In Saskatchewan and the Yukon Territory, Great Horned Owls lay eggs from late February through mid-May (Houston et al. 1998). In west-central Montana, Great Horned Owls lay eggs from mid-February to early April (Baumgartner 1938, Holt pers. obs.). In addition to their latitudinal variation in the timing of laying, it seems that Great Horned Owls may also lay their eggs later at higher elevations.

Occasionally Great Horned Owls lay earlier than normal in a given location. Watson (1933) reported finding a Great Horned Owl nest with one egg at Andover, New York on 29 January 1933, and, on 20 January 1935, Elder (1935) found a female incubating one egg near Madison, Wisconsin. Herein, we describe an unprecedented early nest record for the Great Horned Owl in Montana.

OBSERVATIONS

We have monitored nesting sites of Great Horned Owls near Missoula, Montana, to determine breeding since 1985. Monitoring begins in February, and only once have we seen evidence that nesting began before February. On 19 February 1996, while checking for nesting Great Horned Owls, we observed a nest with a female and two well-developed nestlings at the entrance to the Missoula International Airport, Missoula, MT (46°54′48″N, 114°05′02″W; elevation 960 m). The nest was a platform 7 m above the ground, and was originally constructed by a Black-billed Magpie (*Pica pica*). The nest was in the middle tree of three, medium-sized Russian olive (*Elaeagnus angustifolia*) trees, which were 7.5 m from each other. The trees lined the entrance to the airport, bordering a highway. The male owl was 74 m away in a densely-twigged Norway spruce (*Picea abies*) The surrounding area is relatively flat, and consisted of a mixture of open lands used for ranching, agriculture, and the airport. There were few trees in the area and it was exposed to winds. Thereafter, the nest was monitored daily until the nestlings moved onto nearby branches in the nest tree.

The nestlings were almost identical in size, suggesting similar ages. Great Horned Owls usually hatch two days apart (Houston et al. 1998). After comparing our observations with descriptions and photographs of known-aged Great Horned Owl nestlings (Hoffmeister and Setzer 1947, Austing and Holt 1966), we estimated the nestlings to be 4 wk old on 19 February. Considering a mean incubation period of 33 d (range = 30–37) (Hoffmeister and Setzer 1947, Austing and Holt 1966, Peck and James 1983), then egg laying occurred approximately 22 December and hatching likely occurred about 22 January The young fledged on 11 and 14 March, almost two months earlier than usual for Montana (D. Holt pers. obs.). In fact, all of the breeding pairs that we monitored began to breed in mid-to-late February in 1996 ($N = 17$) Most Great Horned Owls in west-central Montana typically lay their eggs from mid-February to early April (Baumgartner 1938).

The adult Great Horned Owls successfully fledged their young, even though the winter of 1996 was unusually cold Shortly after the eggs would have hatched on about 22 January, there were bitter Arctic winds in Missoula and the average daily temperatures and wind chills (in parentheses) were −1°C (−1°C); −2°C (−4°C); −4°C (−12°C), −8°C (−18°C); −10°C (−12°C); −9°C (−23°C); −15°C (−30°C); −18°C (−23°C); −23°C (−23°C); −25°C (−25°) for 22–31 January and −24°C (−25°C); −26°C (−26°C); −25°C (−26°C); −15°C (−16°C) for 1–4 February. These data were calculated from readings of temperatures and wind speeds taken hourly 800 m from the nest by the National Weather Service.

DISCUSSION

As in all owls, Great Horned Owl nestlings are ptilopeadic (covered in white protoptile down), semi-altricial, and nidicolous (Holt et al. 1999). They are essentially poikilothermic for the first five days after hatching, and are unable to maintain a body temperature >3°C above ambient temperature (Turner and McClanahan 1981)

In comparison with adults, the capacity of nestlings to regulate body temperature is 25% at 15 d, 69% at 20 d, 90% at 25 d, and 95% at 47 d (Turner and McClanahan 1981). During the cold period the owls were forced to endure in January and February 1996, nestlings were dependent on the female for thermoregulation. Female Great Horned Owls brood almost continuously for the first two weeks of the brood period (Houston et al. 1998) while males provide most of the food.

Pakpahan et al. (1989) reported that Great Horned Owls have a low standard metabolic rate (SMR) relative to sympatric raptor species, and that female Great Horned Owls have a lower SMR than males. This low SMR undoubtedly maximizes the efficient use of energy by female Great Horned Owls allowing them to begin nesting earlier than other raptor species. Although our observations help in our understanding of how early nesting can occur in the Great Horned Owl, they leave us wondering what might have influenced this pair to begin nesting two months earlier than the species' usual initiation date in Montana.

Both ultimate and proximate factors interact to influence the onset of breeding; ultimate factors tune a species phenology to the best average time for reproduction while proximate factors act as cues during any one season. Temperature and photoperiod are purported to be important modifiers of annual gonadal cycles (Farner and Mewaldt 1952, Gwinner 1996). The months of November and December had average monthly temperatures of 2.6 and −2.8°C, which were 2.3 and 2.1°C above normal, respectively. It is conceivable that such warm weather could have influenced early gonadal and ovarian development; however, if temperature alone was responsible, then it seems other pairs should have also bred early. Artificial lighting for the airport and its entrance may have influenced the effective photoperiod, but whether this was a contributing cause is not known.

Analysis of the pellets found around the nest and the male roost indicated that the pair relied on voles (*Microtus montanus* and *M. pennsylvanicus*), European Starlings (*Sturnus vulgaris*), and House Sparrows (*Passer domesticus*) for food. Unfortunately, we did not have local population estimates of the prey species. Still, small mammal snap-trapping results in the Mission Valley, approximately 80 km away, resulted in no trapped voles in 500 trapnights (100 traps × 5 nights). Although we are unable to adequately answer the question why this pair initiated its nest so early, the fact that it successfully raised young provides compelling evidence for the hardiness of the Great Horned Owl.

RESUMEN.—Observé un nido de *Bubo virginianus* con pichones de cuatro semanas en febrero 19 de 1996. Los buhos estaban utilizando un nido viejo de *Pica pica* en un árbol de un olivo ruso (*Elaegnus angustifolia*). La postura de huevos y la eclosión ocurrieron en este nido entre diciembre 20 y enero 22, dos meses antes de lo que usualmente ocurre en Montana. El promedio de temperaturas mensuales en noviembre y diciembre fué de 2.3 y 2.1 grados C por encima de lo normal, quizas el clima mas caliente pudo haber influenciado el desarrollo gonadal temprano en esta pareja.

[Traducción de César Márquez]

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